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MARIE, GRASS, FOX, AND PISTAKEE LAKES, LAKE COUNTY, ILLINOIS

Pacific Northwest Environmental
Research Laboratory

Prepared for:

National Environmental Research Center

June 1975

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Report on Marie, Grass, Fox, and Pistakee Lakes, Lake County, Illinois	Prepared June 1975
Anonymous (National Eutrophication Survey Staff)	Working Paper # 305
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Prepared in cooperation with the U.S. Environmental Protection Agency, National Environmental Research Center, Las Vegas, Nevada 89114

Annual total phosphorus and total nitrogen loadings to the lake were estimated and the trophic condition of the lake was evaluated. An assessment of the lake's trophic condition and factors affecting it are presented. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

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U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY
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REPORT

ON

MARIE, GRASS, FOX, AND PISTAKEE LAKES

LAKE COUNTY

ILLINOIS

EPA REGION V

WORKING PAPER No. 305

WITH THE COOPERATION OF THE

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

AND THE

ILLINOIS NATIONAL GUARD

JUNE, 1975

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to fresh water lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the Illinois Environmental Protection Agency for professional involvement and to the Illinois National Guard for conducting the tributary sampling phase of the Survey.

Dr. Richard H. Briceland, Director of the Illinois Environmental Protection Agency; and Ronald M. Barganz, State Survey Coordinator, and John J. Forneris, Manager of Region III, Field Operations Section of the Division of Water Pollution Control, provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

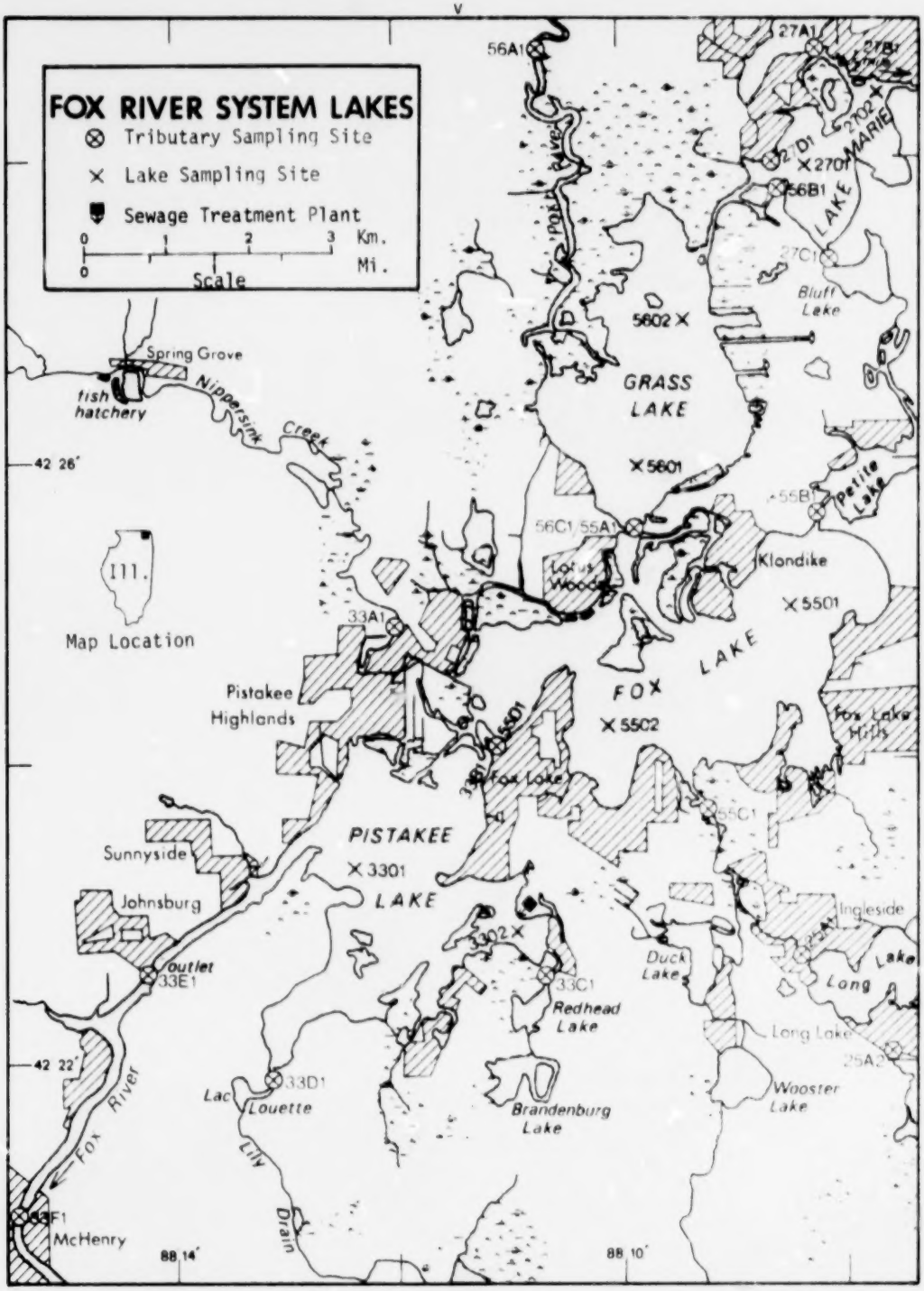
Major General Harold R. Patton, the Adjutant General of Illinois, and Project Officer Colonel Daniel L. Fane, who directed the volunteer efforts of the Illinois National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

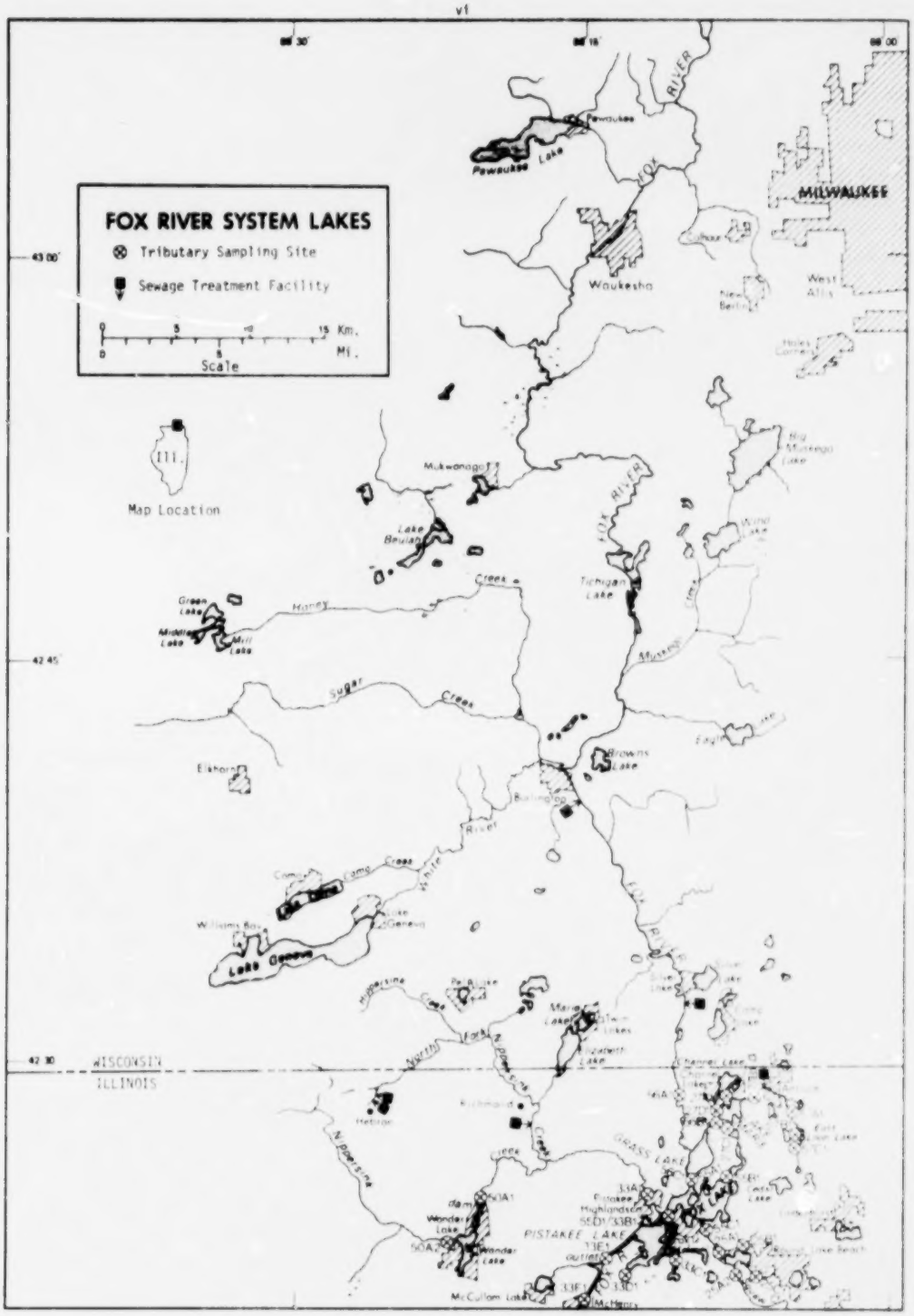
NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF ILLINOIS

LAKE NAME	COUNTY
Baldwin	Randolph
Bloomington	McLean
Carlyle	Bond, Clinton, Fayette
Cedar	Lake
Charleston	Coles
Coffeen	Montgomery
Crab Orchard	Jackson, Williamson
Decatur	Macon
DePue	Bureau
East Loon	Lake
Fox	Lake
Grass	Lake
Highland Silver	Madison
Holiday	LaSalle
Horseshoe	Madison
Long	Lake
Lou Yaeger	Montgomery
Marie	Lake
Old Ben Mine	Franklin
Pistakee	Lake, McHenry
Raccoon	Marion
Rend	Franklin, Jefferson
Sangchris	Christian
Shelbyville	Moultrie, Shelby
Slocum	Lake
Springfield	Sangamon
Storey	Knox
Vandalia	Fayette
Vermilion	Vermilion
Wee Ma Tuk	Fulton
Wonder	McHenry


FOX RIVER SYSTEM LAKES
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Plant
0 1 2 3 Km.
0 Mi.
Scale
Ill.
Map Location
56A1
27A1
27B1
2702
MARIE
LAKE
27D1
2701
56B1
27C1
Bluff Lake
Fox River
5602
GRASS LAKE
5601
Spring Grove
fish hatchery
Nippersink Creek
42 26'
55B1
Petite Lake
56C1 55A1
Lotus Wood
Klondike
5501
33A1
FOX LAKE
Pistakee Highlands
5502
Fox Lake Hills
Fox Lake
55C1
PISTAKEE
3301
LAKE
Sunnyside
Johnsburg
Ingleside
3302
Duck Lake
Long Lake
Outlet
33E1
33C1
Redhead Lake
Long Lake
42 22'
33D1
Lac Louette
Brandenburg Lake
Wooster Lake
25A2
Fox River
Lily Drain
33F1
McHenry
88 14'
88 10'


FOX RIVER SYSTEM LAKES
Tributary Sampling Site
Sewage Treatment Facility
0 5 10 15 Km.
0 5 Mi.
Scale
Ill.
Map Location
88° 30'
88° 15'
88° 00'
43° 00'
42° 45'
42° 30'
WISCONSIN
ILLINOIS
Pewaukee Lake
Pewaukee
Fox River
Waukesha
MILWAUKEE
West Allis
New Berlin
Hales Corners
Mukwonago
Lake Beulah
Big Muskego Lake
Wind Lake
Tichigan Lake
Green Lake
Middle Lake
Mill Lake
Honey Creek
Sugar Creek
Elkhorn
Browns Lake
Burlington
Fox River
White River
Williams Bay
Lake Geneva
Lamb Creek
Highgrove Creek
Marie Lake
Peters Lake
Powers Lake
Trevor Lake
Silver Lake
Richmond
Turtle Creek
N. Branch Creek
Grass Lake
Center Lake
East Loon Lake
Loon Lake
Wandawega
Wandawega Lake
Dam
PISTAKEE LAKE
Pistakee Highlands
McCullom Lake
Matthews

MARIE, GRASS, FOX, and PISTAKEE LAKES

STORET NOS. 1727, 1756, 1755, and 1733

I. CONCLUSIONS

A. Trophic Condition:

Survey data and a report by others (Ketelle and Uttormark, 1971) indicate that the Fox Chain of Lakes (Marie, Grass, Fox, and Pistakee) is eutrophic. Of the 31 Illinois lakes sampled in 1973, Lake Marie ranked fifteenth, Pistakee Lake ranked eighteenth, Grass Lake ranked twentieth, and Fox Lake ranked twenty-sixth when compared using a combination of six parameters*.

1. Lake Marie - Twelve lakes had less median total phosphorus, 16 had less and one had the same median dissolved phosphorus, nine had less median inorganic nitrogen, 19 had less mean chlorophyll a, and eight had greater mean Secchi disc transparency. Survey limnologists noted emergent aquatic vegetation at the outlet and along the shoreline and observed heavy algal blooms. Near-depletion of dissolved oxygen occurred with depth at station 1 in August. Chlorophyll a concentrations increased more than four-fold from the spring to fall sampling along with increased numbers of blue-green algae.

2. Grass Lake - Twenty-five lakes had less median total and dissolved phosphorus, 14 had less median inorganic nitrogen,

* See Appendix A.

27 had less mean chlorophyll a, and 15 had greater mean Secchi disc transparency. Chlorophyll a concentrations increased more than five-fold from the spring to the summer.

Survey limnologists noted emergent aquatic vegetation along much of the shoreline.

3. Fox Lake - Twenty-three of the lakes had less median total phosphorus, 24 had less median dissolved phosphorus, 11 had less median inorganic nitrogen, 25 had less mean chlorophyll a, and 25 had greater mean Secchi disc transparency. No surface algae or higher aquatic plants were observed by Survey limnologists, but chlorophyll a concentrations and numbers of blue-green algae increased substantially during the summer.

4. Pistakee Lake - Twenty-two lakes had less median total phosphorus, 20 had less and one had the same median dissolved phosphorus, nine had less and one had the same median inorganic nitrogen, 26 had less mean chlorophyll a, and 23 had greater mean Secchi disc transparency. Survey limnologists did not observe any aquatic vegetation; however, chlorophyll a concentrations increased more than two-fold from the spring to summer along with increased numbers of blue-green algae.

B. Rate-Limiting Nutrient:

The algal assay results are not considered indicative of conditions present in the lakes because of significant nutrient

losses that occurred in the samples during shipment from the field to the laboratory. However, the lake data indicate that all four lakes were limited by nitrogen during most of the growing season.

C. Nutrient Controllability:

1. Point sources--The mean annual contribution from listed point sources was 13.3% of the total phosphorus input to the Fox Chain of Lakes. The wastewater treatment plant at Burlington, Wisconsin (see map, page vi), and the Fox Lake plant contributed an estimated 5.1% and 2.7% of this total, respectively. The Antioch plant contributed 3.1% and the remaining point sources collectively contributed 2.3% of the total.

A number of additional point sources discharge to Long Lake and to its outlet, Squaw Creek (see Working Paper No. 309, "Report on Long Lake"). To some extent, these sources contribute to the total phosphorus load of Squaw Creek as indicated by the high phosphorus export rate of 92 $kg/km^2/yr$ (see page 24) and thus contribute to the Fox Chain of Lakes nutrient load. These point sources are not included in this report because of the difficulty in accurately estimating the portion of the phosphorus load retained in Long Lake and the portion contributed to Squaw Creek. For this reason, the phosphorus contribution attributed to point sources probably is too low.

The present loading rate of 8.10 $g/m^2/yr$ is more than 12 times the rate proposed by Vollenweider (Vollenweider and Dillon, 1974) as a eutrophic rate (see page 24). Although Vollenweider's model may not be applicable to lakes with short hydraulic retention times, there is little doubt that the phosphorus load is excessive as shown by the abundant growths of macrophytes and blue-green algae. For this reason, all phosphorus loads from known point sources should be minimized to reduce the present rate of eutrophication. A 100% reduction of the phosphorus from the listed point sources would reduce the present loading rate to 7.02 $g/m^2/yr$. Removal of phosphorus from additional point sources, such as those impacting Long Lake, would further reduce the loading rate and should at least slow the rate of eutrophication now occurring. In addition, the relatively short mean hydraulic retention time of the Fox Chain of Lakes (23 days) would facilitate water quality improvement once phosphorus controls have been initiated.

2. Non-point sources--Non-point sources accounted for 86.4% of the total phosphorus load reaching the Fox Chain of Lakes during the sampling year. The Fox River contributed 61.6% and Nippersink Creek contributed 12.8% of the total. The remaining tributaries collectively contributed 7.8%. Ungaged tributaries were estimated to have contributed 4.0% of the total.

Sequoit Creek and Squaw Creek had very high export rates of 104 kg and 92 kg P/km^2/yr, respectively. The Fox River export rate of 45 kg P/km^2/yr may be slightly above average.

The high export rate of Sequoit Creek may be due to unknown point sources, and the Squaw Creek rate is influenced by point sources as discussed above.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS†

A. Lake Morphometry††:

1. Lake Marie -
   a. Surface area: 1.84 kilometers^2.
   b. Mean depth: 1.4 meters.
   c. Maximum depth: >6.1 meters.
   d. Volume: 2.576 x 10^6 m^3.
2. Grass Lake -
   a. Surface area: 5.50 kilometers^2.
   b. Mean depth: 1.1 meters
   c. Maximum depth: ca. 1.8 meters.
   d. Volume: 6.050 x 10^6 m^3.
3. Fox Lake -
   a. Surface area: 6.76 kilometers^2.
   b. Mean depth: 2.4 meters.
   c. Maximum depth: >4.0 meters.
   d. Volume: 16.244 x 10^6 m^3.
4. Pistakee Lake -
   a. Surface area: 6.27 kilometers^2.
   b. Mean depth: 3.2 meters.
   c. Maximum depth: ca. 9.1 meters.
   d. Volume: 20.064 x 10^6 m^3.

† Table of metric conversions--Appendix B.
†† Forneris, 1973.

B. Mean hydraulic retention time for Fox Chain of lakes: 23 days.

C. Tributary and Outlet:
(See Appendix C for flow data)

1. Tributaries -

Name	Drainage area (km^2)*	Mean flow (m^3/sec)*
Squaw Creek (Long Lake outlet)	99.7	0.6
Sequoit Creek	35.7	0.2
Fox River	2,255.9	16.2
Nippersink Creek	528.4	3.4
Minor tributaries & immediate drainage** -	180.8	2.1
Totals	3,100.5	22.5

2. Outlet -

Fox River	3,120.9***	22.5

C. Precipitation†:

1. Year of sampling: 112.2 centimeters.

2. Mean annual: 83.3 centimeters.

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* For limits of accuracy, see Working Paper No. 175, "...Survey Methods, 1973-1976".
** Area and flow adjusted to reflect total ZZ drainage area for Fox Chain of Lakes.
*** Includes the areas of the lakes.
† See Working Paper No. 175.

III. LAKE WATER QUALITY SUMMARY

Marie, Grass, Fox, and Pistakee lakes were sampled three times during the open-water season of 1973 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from two stations on each lake and from one or more depths at each station (see map, page v). During each visit, a single depth-integrated (4.6 m or near bottom to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the first visit, 18.9-liter depth-integrated samples were composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled in Lake Marie were 6.1 meters at station 1 and 1.2 meters at station 2; in Grass Lake, 0.6 meters at station 1 and 0.6 meters at station 2; in Fox Lake, 1.5 meters at station 1 and 4.0 meters at station 2; and in Pistakee Lake, 2.1 meters at station 1 and 2.1 meters at station 2.

The lake sampling results are presented in full in Appendix D and are summarized in the following tables.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR LAKE MARIE
STORET CODE 1727

PARAMETER	1ST SAMPLING (5/ 9/73) 2 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (8/ 7/73) 2 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (10/16/73) 2 SITES RANGE	MEAN	MEDIAN
TEMP (C)	13.8 - 14.0	13.9	13.9	23.4 - 26.0	25.1	25.5	15.4 - 16.2	15.8	16.0
DISS OXY (MG/L)	8.0 - 8.3	8.2	8.2	0.3 - 8.3	5.6	6.9	7.2 - 9.6	8.2	7.8
CNDCTVY (MCROMO)	490. - 500.	498.	500.	490. - 498.	496.	497.	437. - 484.	467.	483.
PH (STAND UNITS)	8.0 - 8.1	8.0	8.0	7.9 - 8.6	8.5	8.6	8.5 - 8.6	8.5	8.5
TOT ALK (MG/L)	194. - 202.	198.	200.	194. - 238.	206.	201.	204. - 218.	212.	214.
TOT P (MG/L)	0.097 - 0.104	0.100	0.098	0.045 - 0.069	0.056	0.058	0.262 - 0.318	0.286	0.286
ORTHO P (MG/L)	0.055 - 0.068	0.060	0.057	0.011 - 0.026	0.015	0.013	0.136 - 0.149	0.143	0.142
NO2+NO3 (MG/L)	0.200 - 0.230	0.216	0.220	0.070 - 0.170	0.100	0.090	0.130 - 0.190	0.164	0.180
AMMONIA (MG/L)	0.140 - 0.180	0.160	0.160	0.070 - 0.450	0.168	0.120	0.090 - 0.220	0.164	0.200
KJEL N (MG/L)	1.000 - 1.200	1.080	1.100	1.400 - 2.000	1.780	1.900	1.700 - 2.400	2.060	2.100
INORG N (MG/L)	0.360 - 0.390	0.376	0.380	0.140 - 0.540	0.268	0.220	0.220 - 0.400	0.328	0.380
TOTAL N (MG/L)	1.210 - 1.430	1.296	1.300	1.470 - 2.090	1.880	1.970	1.880 - 2.540	2.224	2.290
CHLRPYL A (UG/L)	14.8 - 15.6	14.8	14.8	26.6 - 39.5	33.0	33.0	59.6 - 81.9	70.7	70.7
SECCHI (METERS)	0.9 - 0.9	0.9	0.9	1.0 - 1.0	1.0	1.0	0.3 - 0.8	0.6	0.6

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR GRASS LAKE
STORET CODE 1756

PARAMETER	1ST SAMPLING (5/ 9/73) 2 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (8/ 7/73) 2 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (10/16/73) 2 SITES RANGE	MEAN	MEDIAN
TEMP (C)	14.0 - 14.2	14.1	14.1	26.5 - 26.5	26.5	26.5	12.5 - 12.7	12.6	12.6
DISS OXY (MG/L)	9.1 - 9.9	9.5	9.5	11.4 - 12.0	11.7	11.7	9.2 - 9.8	9.5	9.5
CNDCTVY (MCROMO)	560. - 560.	560.	560.	610. - 615.	613.	613.	494. - 514.	501.	495.
PH (STAND UNITS)	8.0 - 8.1	8.0	8.0	8.9 - 9.0	8.9	8.9	8.3 - 8.4	8.4	8.4
TOT ALK (MG/L)	186. - 204.	195.	195.	278. - 282.	281.	281.	234. - 240.	236.	234.
TOT P (MG/L)	0.119 - 0.137	0.128	0.128	0.264 - 0.357	0.308	0.302	0.283 - 0.438	0.347	0.321
ORTHO P (MG/L)	0.083 - 0.090	0.086	0.086	0.088 - 0.117	0.100	0.098	0.093 - 0.116	0.104	0.102
NO2+NO3 (MG/L)	0.770 - 0.810	0.790	0.790	0.130 - 0.190	0.160	0.170	0.800 - 1.010	0.877	0.820
AMMONIA (MG/L)	0.010 - 0.060	0.035	0.035	0.110 - 0.140	0.122	0.120	0.030 - 0.110	0.060	0.040
KJEL N (MG/L)	1.100 - 1.100	1.100	1.100	2.000 - 2.900	2.475	2.500	1.300 - 2.400	1.833	1.800
INORG N (MG/L)	0.820 - 0.830	0.825	0.825	0.240 - 0.310	0.287	0.300	0.840 - 1.120	0.937	0.850
TOTAL N (MG/L)	1.870 - 1.910	1.890	1.890	2.160 - 3.090	2.640	2.655	2.120 - 3.410	2.710	2.600
CHLRPYL A (UG/L)	33.0 - 34.7	33.8	33.8	151.7 - 189.3	170.5	170.5	37.7 - 54.6	46.1	46.1
SECCHI (METERS)	0.6 - 0.8	0.7	0.7	0.5 - 0.5	0.5	0.5	0.3 - 0.3	0.3	0.3

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR FOX LAKE
STORET CODE 1755

PARAMETER	1ST SAMPLING (5/ 9/73) 2 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (8/ 7/73) 2 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (10/16/73) 2 SITES RANGE	MEAN	MEDIAN
TEMP (C)	14.0 - 14.6	14.3	14.3	24.8 - 25.3	24.9	24.8	15.5 - 15.8	15.6	15.6
DISS OXY (MG/L)	9.8 - 10.1	9.9	9.9	6.2 - 7.2	6.5	6.2	9.2 - 9.2	9.2	9.2
CNDCTVY (MCROMO)	490. - 510.	500.	500.	573. - 578.	576.	577.	469. - 475.	472.	472.
PH (STAND UNITS)	8.3 - 8.5	8.4	8.4	8.6 - 8.7	8.6	8.6	****** - **********		
TOT ALK (MG/L)	192. - 200.	196.	196.	203. - 274.	221.	203.	****** - **********		
TOT P (MG/L)	0.129 - 0.152	0.138	0.136	0.287 - 0.341	0.312	0.311	****** - **********		
ORTHO P (MG/L)	0.030 - 0.058	0.044	0.044	0.108 - 0.135	0.125	0.128	****** - **********		
NO2+NO3 (MG/L)	0.090 - 0.400	0.247	0.250	0.150 - 0.180	0.167	0.170	****** - **********		
AMMONIA (MG/L)	0.090 - 0.100	0.097	0.100	0.170 - 0.230	0.207	0.215	****** - **********		
KJEL N (MG/L)	0.800 - 1.200	0.975	0.950	2.700 - 3.400	2.975	2.900	****** - **********		
INORG N (MG/L)	0.190 - 0.500	0.345	0.345	0.350 - 0.400	0.375	0.375	****** - **********		
TOTAL N (MG/L)	1.000 - 1.400	1.222	1.245	2.880 - 3.550	3.142	3.070	****** - **********		
CHLRPYL A (UG/L)	42.4 - 48.1	45.2	45.2	92.7 - 125.0	108.8	108.8	24.3 - 50.6	37.4	37.4
SECCHI (METERS)	0.5 - 0.5	0.5	0.5	0.2 - 0.3	0.2	0.2	0.3 - 0.4	0.3	0.3

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR PISTAKEE LAKE
STORET CODE 1733

PARAMETER	1ST SAMPLING (5/ 9/73) 2 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (8/ 7/73) 2 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (10/16/73) 2 SITES RANGE	MEAN	MEDIAN
TEMP (C)	14.5 - 14.6	14.6	14.6	24.6 - 25.3	24.9	24.7	15.6 - 15.8	15.7	15.7
DISS OXY (MG/L)	9.6 - 9.8	9.7	9.7	8.0 - 8.0	8.0	8.0	9.6 - 9.6	9.6	9.6
CNDCTVY (MCROMO)	500. - 530.	515.	510.	567. - 586.	579.	584.	451. - 482.	467.	467.
PH (STAND UNITS)	8.3 - 8.5	8.4	8.4	8.7 - 8.7	8.7	8.7	8.7 - 8.9	8.8	8.8
TOT ALK (MG/L)	192. - 198.	194.	193.	270. - 292.	283.	288.	198. - 218.	208.	208.
TOT P (MG/L)	0.116 - 0.203	0.144	0.129	0.246 - 0.301	0.272	0.269	0.201 - 0.232	0.216	0.216
ORTHO P (MG/L)	0.035 - 0.062	0.043	0.037	0.071 - 0.125	0.100	0.105	0.010 - 0.073	0.041	0.041
NO2+NO3 (MG/L)	0.260 - 0.490	0.377	0.380	0.120 - 0.200	0.173	0.200	0.060 - 0.410	0.235	0.235
AMMONIA (MG/L)	0.070 - 0.120	0.095	0.095	0.110 - 0.140	0.123	0.120	0.060 - 0.070	0.065	0.065
KJEL N (MG/L)	1.000 - 1.200	1.050	1.000	2.400 - 3.100	2.800	2.900	1.600 - 1.800	1.700	1.700
INORG N (MG/L)	0.370 - 0.570	0.472	0.475	0.230 - 0.340	0.297	0.320	0.120 - 0.480	0.300	0.300
TOTAL N (MG/L)	1.260 - 1.490	1.427	1.480	2.600 - 3.220	2.973	3.100	1.660 - 2.210	1.935	1.935
CHLRPYL A (UG/L)	41.7 - 56.4	49.0	49.0	94.1 - 130.0	112.0	112.0	59.7 - 73.3	66.5	66.5
SECCHI (METERS)	0.5 - 0.6	0.6	0.6	0.2 - 0.3	0.2	0.2	0.3 - 0.3	0.3	0.3

B. Biological characteristics:

1. Phytoplankton -

a. Lake Marie -

Sampling Date	Dominant Genera	Algal units per ml
05/09/73	1. Asterionella sp.	2,233
	2. Aphanizomenon sp.	918
	3. Dinobryon sp.	658
	4. Cryptomonas sp.	480
	5. Melosira sp.	301
	Other genera	959
	Total	5,549
08/07/73	1. Aphanizomenon sp.	2,015
	2. Oscillatoria sp.	1,670
	3. Anabaena sp.	371
	4. Melosira sp.	345
	5. Microcystis sp.	106
	Other genera	504
	Total	5,011
10/16/73	1. Aphanizomenon sp.	4,294
	2. Cryptomonas sp.	577
	3. Stephanodiscus sp.	197
	4. Microcystis sp.	152
	5. Oocystis sp.	152
	Other genera	485
	Total	5,857

b. Grass Lake -

Sampling Date	Dominant Genera	Algal units per ml
05/09/73	1. Dinobryon sp.	2,723
	2. Coccoid green cells	1,808
	3. Cyclotella sp.	1,362
	4. Flagellates	826
	5. Oscillatoria sp.	737
	Other genera	2,811
	Total	10,267
08/07/73	1. Cyclotella sp.	10,253
	2. Coscinodiscus sp.	7,098
	3. Melosira sp.	1,627
	4. Scenedesmus sp.	986
	5. Nitzschia sp.	690
	Other genera	5,274
	Total	25,928
10/16/73	1. Cyclotella sp.	4,048
	2. Centric diatoms	4,048
	3. Melosira sp.	3,889
	4. Flagellates	1,944
	5. Dactylococcopsis sp.	1,071
	Other genera	2,779
	Total	17,779

c. Fox Lake -

Sampling Date	Dominant Genera	Algal units per ml
05/09/73	1. Stephanodiscus sp.	2,166
	2. Dinobryon sp.	2,055
	3. Asterionella sp.	1,201
	4. Cyclotella sp.	800
	5. Cryptomonas sp.	800
	Other genera	2,254
	Total	9,276
08/07/73	1. Aphanizomenon sp.	2,631
	2. Melosira sp.	1,014
	3. Stephanodiscus sp.	992
	4. Microcystis sp.	324
	5. Oscillatoria sp.	259
	Other genera	992
	Total	6,212
10/16/73	1. Melosira sp.	2,668
	2. Aphanizomenon sp.	617
	3. Cyclotella sp.	309
	4. Oocystis sp.	309
	5. Microcystis sp.	272
	Other genera	1,033
	Total	5,208

d. Pistakee Lake -

Sampling Date	Dominant Genera	Algal units per ml
05/09/73	1. Cyclotella sp.	1,275
	2. Melosira sp.	884
	3. Asterionella sp.	740
	4. Cryptomonas sp.	658
	5. Stephanodiscus sp.	617
	Other genera	3,268
	Total	7,442
08/07/73	1. Aphanizomenon sp.	3,769
	2. Melosira sp.	1,979
	3. Stephanodiscus sp.	1,005
	4. Microcystis sp.	502
	5. Dictyosphaerium sp.	220
	Other genera	1,631
	Total	9,106
10/16/73	1. Melosira sp.	5,618
	2. Aphanizomenon sp.	995
	3. Microcystis sp.	468
	4. Coelastrum sp.	204
	5. Chroococcus sp.	176
	Other genera	1,200
	Total	8,661

2. Chlorophyll *a* -

Sampling Date	Station Number	Chlorophyll *a* (µg/l)
05/09/73	Marie 01	15.6
	Marie 02	14.0
	Grass 01	33.0
	Grass 02	34.7
	Fox 01	42.4
	Fox 02	48.1
	Pistakee 01	41.7
	Pistakee 02	56.4
08/07/73	Marie 01	26.6
	Marie 02	39.5
	Grass 01	151.7
	Grass 02	189.3
	Fox 01	125.0
	Fox 02	92.7
	Pistakee 01	94.1
	Pistakee 02	130.0
10/16/73	Marie 01	81.9
	Marie 02	59.6
	Grass 01	37.7
	Grass 02	54.6
	Fox 01	50.6
	Fox 02	24.3
	Pistakee 01	59.7
	Pistakee 02	73.3

C. Limiting Nutrient Study:

The algal assay results for all four lakes are not considered indicative of lake conditions at sampling time (05/09/73) because of substantial nutrient losses in the samples during shipment from the field to the laboratory. However, the lake data indicate that all four lakes were nitrogen limited during the sampling year

at all stations with two exceptions. Following is a tabulation of the mean inorganic nitrogen to orthophosphorus ratios for each of the stations and sampling times with indicated limiting nutrient in parentheses.

Station	05/09/73	08/07/73	10/16/73
Marie 01	7/1 (N)	20/1 (P)	3/1 (N)
Marie 02	6/1 (N)	12/1 (N)	2/1 (N)
Grass 01	10/1 (N)	3/1 (N)	10/1 (N)
Grass 02	9/1 (N)	3/1 (N)	9/1 (N)
Fox 01	12/1 (N)	3/1 (N)	---
Fox 02	9/1 (N)	3/1 (N)	---
Pistakee 01	11/1 (N)	3/1 (N)	48/1 (P)
Pistakee 02	11/1 (N)	3/1 (N)	2/1 (N)

Nitrogen limitation, as indicated by the algal assay or by in-lake nitrogen to phosphorus ratios, does not necessarily suggest that the trophic condition of the lake can be improved by controlling nitrogen inputs. In the majority of cases, phosphorus is still the element to be controlled. The apparent condition of nitrogen-limitation frequently results from excessive phosphorus input from point sources and is often accompanied by a corresponding increase in primary production. The reversal of the enriched condition, therefore, depends upon phosphorus control, not nitrogen control.

IV. NUTRIENT LOADINGS
(See Appendix E for data)

For the determination of nutrient loadings, the Illinois National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the maps (pages v and vi), except for the high runoff months of March and April when two samples were collected. Sampling was begun in June, 1973, and was completed in April, 1974.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Illinois District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a U.S. Geological Survey computer program for calculating stream loadings*. Nutrient loads shown are those measured minus point-source loads, if any.

Nutrient loads for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the nutrient loads, in $kg/km^2/year$, in Nippersink Creek at station 33A-1 and multiplying by the ZZ area in km^2.

The operators of the Antioch, Hebron Municipal, and Hebron Industrial wastewater treatment plants provided monthly effluent samples and corresponding flow data. However, Fox Lake Village, Richmond,

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* See Working Paper No. 175.

Burlington, and Silver Lake did not participate in the sampling program, and nutrient loads were estimated at 1.134 kg P and 3.401 kg N/capita/year.

A number of wastewater treatment plants impact nearby Long Lake through discharge to its tributaries. Therefore, a portion of the Squaw Creek outlet nutrient loads is contributed by these point sources and also enters the Fox Chain of Lakes at Fox Lake. However, it is difficult to accurately calculate the load due to these point sources (see Working Paper No. 309, "Report on Long Lake"). Consequently, the entire nutrient loads measured in Squaw Creek at station A-1 are included as non-point loads.

Separate nutrient loadings could not be calculated for each of the four lakes in this report because no flow measurements were provided for the sampling points between the lakes. A total nutrient load was calculated for all four lakes however, and this provides an overall view of point-source impact on the Fox Chain of Lakes.

A. Waste Sources:

1. Known mun icipal -

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
Antioch*	3,300	act. sludge	2,673.5	Sequoit Creek
Hebron Municipal*	800	trickling filter	190.4	Nippersink Creek
Fox Lake**	3,900†	trickling filter	1,476.2	Myers Bay
Richmond**	980†	trickling filter	370.9	Nippersink Creek
Burlington***	7,479††	trickling filter	2,830.8	Fox River
Silver Lake***	1,210††	act. sludge	458.0	Fox River

2. Known industrial -

Name	Product	Treatment	Mean Flow (m^3/d)	Receiving Water
Hebron Industrial*		trickling filter	474.7	Nippersink Creek

† Anonymous, 1972.
†† 1970 Census.
* Treatment plant questionnaires.
** Anonymous, 1972; flow estimated at 0.3785 m^3/capita/day.
*** Anonymous, 1971; flow estimated at 0.3785 m^3/capita/day.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/ yr	% of total
a. Tributaries (non-point load) -		
Squaw Creek	9,195	5.6
Sequoit Creek	3,710	2.2
Fox River	101,545	61.6
Nippersink Creek	21,060	12.8
b. Minor tributaries & immediate drainage (non-point load) -	6,690	4.0
c. Known municipal STP's -		
Village of Antioch	5,155	3.1
Hebron Municipal	840	0.5
Fox Lake	4,425	2.7
Richmond	1,110	0.7
Burlington	8,480	5.1
Silver Lake	1,370	0.8
d. Septic tanks* -	640	0.4
e. Known industrial -		
Hebron Industrial	415	0.3
f. Direct precipitation** -	355	0.2
Total	164,990	100.0

2. Outputs -

Lake outlet - Fox River	153,275

3. Net annual P accumulation - 11,715 kg.

* Estimate based on 2,247 lakeshore dwellings; see Working Paper No. 175.
** See Working Paper No. 175.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/yr	% of total
a. Tributaries (non-point load) -		
Squaw Creek	64,845	3.0
Sequoit Creek	25,960	1.2
Fox River	1,452,550	68.0
Nippersink Creek	361,960	16.9
b. Minor tributaries & immediate drainage (non-point load) -	121,875	5.7
c. Known municipal STP's -		
Village of Antioch	10,365	0.5
Hebron Municipal	1,530	0.1
Fox Lake	13,265	0.6
Richmond	3,335	0.2
Burlington	25,435	1.2
Silver Lake	4,115	0.2
d. Septic tanks* -	24,055	1.1
e. Known industrial -		
Hebron Industrial	5,750	0.3
f. Direct precipitation** -	21,990	1.0
Total	2,137,030	100.0

2. Outputs -

Lake outlet - Fox River 1,995,175

3. Net annual N accumulation - 141,855 kg.

* Estimate based on 2,247 lakeshore dwellings; see Working Paper No. 175.
** See Working Paper No. 175.

D. Mean Annual Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km²/yr	kg N/km²/yr
Squaw Creek	92	650
Sequoit Creek	104	727
Fox River	45	644
Nippersink Creek	40	685

E. Yearly Loading Rates:

In the following table, the existing phosphorus loading rates are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). Essentially, his "dangerous" rate is the rate at which the receiving water would become eutrophic or remain eutrophic; his "permissible" rate is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic rate would be considered one between "dangerous" and "permissible".

Note that Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m²/yr	8.10	0.58	104.9	7.0

Vollenweider loading rates for phosphorus ($g/m^2/yr$) based on mean depth and mean hydraulic retention time of Fox Chain of Lakes*:

"Dangerous" (eutrophic rate)	0.64
"Permissible" (oligotrophic rate)	0.32

* Based on morphometry of all four lakes.

V. LITERATURE REVIEWED

Anonymous, 1971. Inventory of municipal waste facilities. EPA Publ. OWP-1, vol. 5, Washington, D.C.

Anonymous, 1972. Wastewater treatment works data book. IL Env. Prot. Agency, Springfield.

Forneris, John J., 1973. Personal communication (lake morphometry). IL Env. Prot. Agency, Springfield.

Ketelle, Martha J., and Paul D. Uttormark, 1971. Problem lakes in the United States. EPA Water Poll. Contr. Res. Ser., Proj. #16010 EHR, Washington, DC.

Vollenweider, R. A., and P. J. Dillon, 1974. The application of the phosphorus loading concept to eutrophication research. Natl. Res. Council of Canada Publ. No. 13690, Canada Centre for Inland Waters, Burlington, Ontario.

VI. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
1703	LAKE BLOOMINGTON	0.050	5.730	464.667	26.200	14.800	0.020
1706	LAKE CARLYLE	0.084	1.270	477.889	17.367	11.000	0.032
1708	LAKE CHARLESTON	0.160	4.680	490.667	12.000	8.400	0.065
1711	COFFEEN LAKE	0.032	0.260	456.222	7.700	14.900	0.012
1712	CRAB ORCHARD LAKE	0.082	0.200	482.222	59.867	13.800	0.013
1714	LAKE DECATUR	0.129	3.750	474.571	43.000	14.500	0.062
1725	LONG LAKE	0.704	1.170	482.667	49.333	8.800	0.398
1726	LAKE LOU YAEGER	0.186	1.600	489.583	10.662	11.400	0.076
1727	LAKE MARIE	0.098	0.370	467.667	39.533	14.700	0.057
1733	PISTAKEE LAKE	0.203	0.370	485.667	75.867	7.000	0.062
1735	REND LAKE	0.071	0.210	471.500	23.533	12.700	0.012
1739	LAKE SHELBYVILLE	0.062	3.290	461.333	17.161	14.800	0.019
1740	SILVER LAKE (HIGHLAND)	0.226	0.970	484.500	5.822	14.800	0.057
1742	LAKE SPRINGFIELD	0.103	3.265	483.385	13.013	10.800	0.059
1748	VERMILION LAKE	0.109	4.695	481.500	31.150	14.200	0.050
1750	WONDER LAKE	0.426	0.840	486.000	98.533	7.800	0.132
1751	LAKE STORY	0.072	2.510	454.333	17.250	14.800	0.021
1752	DEPUE LAKE	0.438	4.050	490.000	58.833	7.600	0.276
1753	LAKE SANGCHRIS	0.050	1.970	475.417	19.242	14.500	0.009
1754	LAKE HOLIDAY	0.167	3.135	485.167	51.217	7.200	0.046
1755	FOX LAKE	0.214	0.375	486.167	63.850	8.800	0.083
1756	GRASS LAKE	0.301	0.420	481.000	83.500	5.400	0.093
1757	EAST LOON LAKE	0.076	0.120	450.000	22.300	14.900	0.015
1758	SLOCUM LAKE	0.865	0.200	487.333	221.100	5.800	0.362
1759	CEDAR LAKE	0.029	0.170	400.333	5.767	12.800	0.013
1761	LAKE MATTOON	0.069	1.770	466.333	7.967	14.500	0.031
1762	RACCOON LAKE	0.136	0.310	484.333	19.217	13.800	0.020
1763	BALDWIN LAKE	0.044	0.140	461.167	11.333	13.200	0.007

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
1764	LAKE VANDALIA	0.116	0.480	478.111	11.276	14.800	0.023
1765	OLD BEN MINE RESERVOIR	0.930	0.205	478.333	31.433	11.200	0.575
1766	HORSESHOE LAKE	0.127	0.705	482.833	182.250	6.600	0.018

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500- MEAN SEC	MEAN CHLORA	15- MIN DO	MEDIAN DISS ORTHO P	INDEX NO
1703	LAKE BLOOMINGTON	88 (26)	0 (0)	80 (24)	47 (14)	13 (2)	68 (20)	296
1706	LAKE CARLYLE	63 (19)	40 (12)	63 (19)	63 (19)	63 (19)	53 (16)	345
1708	LAKE CHARLESTON	37 (11)	7 (2)	0 (0)	77 (23)	77 (23)	27 (8)	225
1711	COFFEEN LAKE	97 (29)	77 (23)	93 (28)	93 (28)	2 (0)	92 (27)	454
1712	CRAB ORCHARD LAKE	67 (20)	90 (27)	43 (13)	20 (6)	42 (12)	85 (25)	347
1714	LAKE DECATUR	40 (12)	13 (4)	53 (16)	33 (10)	30 (8)	32 (9)	201
1725	LONG LAKE	7 (2)	43 (13)	40 (12)	30 (9)	72 (21)	3 (1)	195
1726	LAKE LOU YAEGER	30 (9)	37 (11)	7 (2)	87 (26)	57 (17)	23 (7)	241
1727	LAKE MARIE	60 (18)	68 (20)	73 (22)	37 (11)	23 (7)	42 (12)	303
1733	PISTAKEE LAKE	27 (8)	68 (20)	23 (7)	13 (4)	90 (27)	32 (9)	253
1735	RENO LAKE	77 (23)	80 (24)	70 (21)	50 (15)	53 (16)	92 (27)	422
1739	LAKE SHELBYVILLE	83 (25)	17 (5)	83 (25)	70 (21)	13 (2)	73 (22)	339
1740	SILVER LAKE (HIGHLAND)	20 (6)	47 (14)	10 (3)	97 (29)	13 (2)	42 (12)	229
1742	LAKE SPRINGFIELD	53 (16)	20 (6)	33 (10)	73 (22)	67 (20)	37 (11)	283
1748	VERMILION LAKE	50 (15)	3 (1)	47 (14)	43 (13)	37 (11)	47 (14)	227
1750	WONDER LAKE	13 (4)	50 (15)	20 (6)	7 (2)	80 (24)	13 (4)	183
1751	LAKE STORY	73 (22)	27 (8)	90 (27)	67 (20)	13 (2)	63 (19)	333
1752	DEPUE LAKE	10 (3)	10 (3)	3 (1)	23 (7)	83 (25)	10 (3)	139
1753	LAKE SANGCHRIS	88 (26)	30 (9)	67 (20)	57 (17)	30 (8)	97 (29)	369
1754	LAKE HOLIDAY	33 (10)	23 (7)	27 (8)	27 (8)	87 (26)	50 (15)	247
1755	FOX LAKE	23 (7)	63 (19)	17 (5)	17 (5)	72 (21)	20 (6)	212
1756	GRASS LAKE	17 (5)	53 (16)	50 (15)	10 (3)	97 (29)	17 (5)	244
1757	EAST LOON LAKE	70 (21)	100 (30)	97 (29)	53 (16)	2 (0)	77 (23)	399
1758	SLOCUM LAKE	3 (1)	87 (26)	13 (4)	0 (0)	100 (30)	7 (2)	210
1759	CEDAR LAKE	100 (30)	93 (28)	100 (30)	100 (30)	50 (15)	85 (25)	526
1761	LAKE HEMATUK	80 (24)	33 (10)	77 (23)	90 (27)	30 (8)	57 (17)	367
1762	RACCOON LAKE	57 (17)	73 (22)	30 (9)	60 (18)	42 (12)	68 (20)	330
1763	BALDWIN LAKE	93 (28)	97 (29)	87 (26)	80 (24)	47 (14)	100 (30)	504

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
1764	LAKE VANDALIA	47 (14)	60 (18)	60 (18)	83 (25)	13 (2)	60 (18)	323
1765	OLD BEN MINE RESERVOIR	0 (0)	83 (25)	57 (17)	40 (12)	60 (18)	0 (0)	240
1766	HORSESHOE LAKE	43 (13)	57 (17)	37 (11)	3 (1)	93 (28)	80 (24)	313

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	1759	CEDAR LAKE	528
2	1763	BALDWIN LAKE	504
3	1711	COFFEEN LAKE	454
4	1735	RENO LAKE	422
5	1757	EAST LOON LAKE	399
6	1753	LAKE SANGCHRIS	369
7	1761	LAKE HEMATUA	367
8	1712	CRAB ORCHARD LAKE	347
9	1706	LAKE CARLYLE	345
10	1739	LAKE SHELBYVILLE	339
11	1751	LAKE STORY	333
12	1762	RACCOON LAKE	330
13	1764	LAKE VANDALIA	323
14	1766	HORSESHOE LAKE	313
15	1727	LAKE MARIE	303
16	1703	LAKE BLOOMINGTON	296
17	1742	LAKE SPRINGFIELD	283
18	1733	PISTAKEE LAKE	253
19	1754	LAKE HOLIDAY	247
20	1756	GRASS LAKE	244
21	1726	LAKE LOU YAEGER	241
22	1765	OLD DEN MINE RESERVOIR	240
23	1740	SILVER LAKE (HIGHLAND)	229
24	1748	VERMILION LAKE	227
25	1708	LAKE CHARLESTON	225
26	1755	FOX LAKE	212
27	1750	SLOCUM LAKE	210
28	1714	LAKE DECATUR	91

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
29	1725	LONG LAKE	195
30	1750	WONDER LAKE	183
31	1752	DEPUE LAKE	139

APPENDIX B

CONVERSIONS FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

TRIBUTARY FLOW DATA

APPENDIX C

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR ILLINOIS 10/23/75

LAKE CODE 1727 LAKE MARIE

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 0.0

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
172781	35.7	0.22	0.35	0.42	0.43	0.34	0.29	0.17	0.09	0.06	0.06	0.10	0.12	0.22
172722	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 0.0
SUM OF SUB-DRAINAGE AREAS = 0.0
TOTAL FLOW IN = 0.0
TOTAL FLOW OUT = 2.65

NOTE *** PART OF FOX CHAIN OF LAKES

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
172781	6	73	0.71	2	0.01				
	7	73	0.25	7	0.01				
	8	73	0.11	18	0.08				
	9	73	0.04	9	0.04				
	10	73	0.07						
	11	73	0.31	4	0.34				
	12	73	0.74	2	0.22				
	1	74	0.76	6	0.22				

TRIBUTARY FLOW INFORMATION FOR ILLINOIS 10/23/75

LAKE CODE 1756 GRASS LAKE

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 2255.9

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
1756A1	2255.9	16.68	21.66	28.88	30.30	32.28	17.41	11.41	6.31	4.90	6.09	8.44	9.85	16.15
1756Z2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 2255.9
SUM OF SUB-DRAINAGE AREAS = 0.0

TOTAL FLOW IN = 0.0
TOTAL FLOW OUT = 194.23

NOTE *** PART OF FOX CHAIN OF LAKES

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
1756A1	6	73	33.98	2	43.61				
	7	73	13.37	7	15.29				
	8	73	10.05	18	8.52				
	9	73	11.81	9	12.43				
	10	73	21.38	14	21.66				
	11	73	19.85	4	22.82				
	12	73	27.30	2	23.45				
	1	74	27.86	6	18.12				
	2	74	38.79	10	33.98				
	3	74	81.27	18	60.88	24	43.89		
	4	74	52.18	3	59.18	30	52.95		

32A

TRIBUTARY FLOW INFORMATION FOR ILLINOIS 10/23/75

LAKE CODE 1733 LAKE PISTAKEE

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 3237.5

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
1733A1	528.4	3.51	4.98	6.91	6.57	5.18	4.25	2.64	1.39	1.02	1.18	1.65	1.92	3.42
1733E1	3120.9	23.13	29.73	40.21	41.91	44.74	24.21	16.03	9.06	7.11	8.72	12.01	13.85	22.51
1733F1	3237.5	23.90	30.58	41.34	43.04	46.16	25.03	16.57	9.40	7.39	9.03	12.40	14.33	23.22
1733ZZ	119.1	0.76	0.85	1.13	1.13	1.42	0.82	0.54	0.34	0.28	0.31	0.48	0.48	0.78

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 3237.5
SUM OF SUB-DRAINAGE AREAS = 3768.4
TOTAL FLOW IN = 320.37
TOTAL FLOW OUT = 279.18

NOTE *** FOX CHAIN OF LAKES -- 10/73 TO 5/74

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
1733A1	6	73	7.42	3	6.63				
	7	73	3.99	7	5.04				
	8	73	2.92	4	4.16				
	9	73	3.37	8	1.78				
	10	73	6.63	13	8.66				
	11	73	5.04	3	4.47				
	12	73	7.90	2	5.52				
	1	74	9.83	5	3.79				
	2	74	12.52	3	21.83	23	16.28		
	3	74	18.58	9	23.08	16	13.82		
	4	74	12.40	7	10.19				
	5	74	15.29	18	44.17				
1733E1	6	73	47.01	3	61.73				
	7	73	16.99	7	20.84				
	8	73	12.77	4	15.86				
	9	73	16.03	8	14.67				
	10	73	48.70	13	64.00				
	11	73	28.60	3	25.46				
	12	73	42.76	2	41.91				
	1	74	40.49	5	33.70				
	2	74	67.39	2	105.62	23	59.47		
	3	74	94.01	9	122.90	16	115.53		
	4	74	67.96	7	70.51				
	5	74	78.15	18	96.56				

TRIBUTARY FLOW INFORMATION FOR ILLINOIS 10/23/75

LAKE CODE 1733 LAKE PISTAKEE

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
1733F1	10	73	50.69	13	66.26				
	11	73	29.45	3	26.31				
	12	73	44.17	2	43.32				
	1	74	41.91	5	34.83				
	2	74	69.38	2	108.45	23	61.16		
	3	74	96.84	9	126.58	16	118.65		
	4	74	69.66	7	72.21				
	5	74	80.70	18	99.68				
1733ZZ	6	73	3.14	3	2.80				
	7	73	1.16	7	1.42				
	8	73	1.19	4	1.73				
	9	73	0.71	8	0.37				
	10	73	1.98	13	2.27				
	11	73	0.85	3	0.85				
	12	73	1.42	2	1.42				
	1	74	1.42	5	1.13				
	2	74	1.98	2	2.83	23	1.70		
	3	74	2.83	9	3.68	16	3.11		
	4	74	1.70	7	1.70				
	5	74	2.55	18	3.11				

TRIBUTARY FLOW INFORMATION FOR ILLINOIS 10/23/75

LAKE CODE 1733 LAKE PISTAKEE

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 3120.9

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
1733A1	528.4	3.51	4.98	6.91	6.57	5.18	4.25	2.64	1.39	1.02	1.18	1.65	1.92	3.42
1725A1	180.5	0.65	0.98	1.21	1.24	0.98	0.82	0.49	0.26	0.18	0.19	0.29	0.34	0.63
1727B1	35.7	0.22	0.35	0.42	0.43	0.34	0.24	0.17	0.09	0.06	0.06	0.10	0.12	0.22
1756A1	2255.9	16.68	21.66	28.88	30.30	32.28	17.41	11.41	6.31	4.90	6.09	8.44	9.85	16.15
1733E1	3120.9	23.13	29.73	40.21	41.91	44.74	24.21	16.03	9.06	7.11	8.72	12.01	13.85	22.51
1733Z2	218.6	2.08	1.76	2.79	3.37	5.95	1.44	1.31	1.01	0.95	1.19	1.54	1.61	2.89

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 3120.9
SUM OF SUB-DRAINAGE AREAS = 3139.1

TOTAL FLOW IN = 278.70
TOTAL FLOW OUT = 278.71

NOTE *** FOX CHAIN OF LAKES -- 6/73 TO 9/73

NO DAILY FLOW DATA ON FILE

40

APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 75/10/23

172701
42 27 58.0 088 08 18.0
LAKE MARIE
17097 ILLINOIS

11EPALES 2111202
3 0022 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 N02&N03 N-TOTAL MG/L	0067 PHOS-DIS ORTHO MG/L P
73/05/09	12 05	0000	13.9		36	500	8.00	200	0.140	1.200	0.230	0.055
	12 05	0006	13.8	8.0		500	8.00	202	0.160	1.000	0.220	0.055
	12 05	0018	13.8	8.2		500	8.00	200	0.140	1.100	0.220	0.057
73/08/07	12 50	0000	25.5	8.3	40	498	8.60	201	0.130	1.700	0.170	0.011
	12 50	0005	25.5			498						
	12 50	0010	25.0	6.4		497	8.60	201	0.070	1.900	0.070	0.011
	12 50	0015	24.4			495						
	12 50	0018	23.4	0.3		490	7.90	238	0.450	2.000	0.090	0.026
73/10/16	12 30	0000	16.2		12	484	8.50	214	0.210	2.100	0.190	0.142
	12 30	0004	16.2	7.8		484	8.50	216	0.200	1.900	0.180	0.140
	12 30	0020	16.0	7.2		483	8.50	218	0.220	1.700	0.180	0.149

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/09	12 05	0000	0.098	15.6
	12 05	0006	0.097	
	12 05	0018	0.104	
73/08/07	12 50	0000	0.058	26.6
	12 50	0010	0.063	
	12 50	0018	0.069	
73/10/16	12 30	0000	0.286	81.9
	12 30	0004	0.264	
	12 30	0020	0.318	

42

STORET RETRIEVAL DATE 75/10/23

172702
42 28 28.0 088 07 38.0
LAKE MARIE
17097 ILLINOIS

11EPALES 2111202
3 0008 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/09	12 25	0000	14.0		36	500	8.10	194	0.180	1.100	0.200	0.068
	12 25	0004	14.0	8.3		490	8.10	194	0.180	1.000	0.210	0.067
73/08/07	12 30	0000	26.0		38	496	8.60	194	0.120	1.900	0.100	0.016
	12 30	0003	26.0	7.4		497	8.60	195	0.070	1.400	0.070	0.013
73/10/16	14 50	0000	15.4		32	448	8.60	208	0.100	2.400	0.140	0.147
	14 50	0002	15.4	9.6		437	8.60	204	0.090	2.200	0.130	0.136

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/09	12 25	0000	0.098	14.0
	12 25	0004	0.104	
73/08/07	12 30	0000	0.045	39.5
	12 30	0003	0.047	
73/10/16	14 50	0000	0.300	59.6
	14 50	0002	0.262	

STORET RETRIEVAL DATE 75/10/23

175601
42 25 58.0 088 09 50.0
GRASS LAKE
17097 ILLINOIS

1IEPALES 2111202
3 0004 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/09	11 30	0000	14.2	9.1	24	560	8.10	204	0.010	1.100	0.810	0.083
73/08/07	15 05	0000	26.5		18	615	9.00	282	0.110	2.300	0.130	0.088
	15 05	0002	26.5	11.4		615	8.90	282	0.140	2.000	0.160	0.091
73/10/16	12 05	0000	12.5	9.2	12	514	8.30	240	0.110	2.400	1.010	0.116

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/09	11 30	0000	0.137	33.0
73/08/07	15 05	0000	0.264	151.7
	15 05	0002	0.303	
73/10/16	12 05	0000	0.438	37.7

STORET RETRIEVAL DATE 75/10/23

175602
42 26 58.0 088 09 23.0
GRASS LAKE
17097 ILLINOIS

11EPALES
3

2111202
0005 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/09	11	50 0000	14.0	9.9	30	560	8.00	186	0.060	1.100	0.770	0.090
73/08/07	14	45 0000	26.5		18	610	8.90	278	0.120	2.700	0.180	0.117
	14	45 0002	26.5	12.0		611	8.90	280	0.120	2.900	0.190	0.105
73/10/16	12	15 0000	12.7		12	495	8.40	234	0.040	1.800	0.800	0.102
	12	15 0002	12.6	9.8		494	8.40	234	0.030	1.300	0.820	0.093

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/09	11	50 0000	0.119	34.7
73/08/07	14	45 0000	0.301	189.3
	14	45 0002	0.357	
73/10/16	12	15 0000	0.283	54.6
	12	15 0002	0.321	

STORET RETRIEVAL DATE 75/10/23

175501
42 25 03.0 088 08 28.0
FOX LAKE
17097 ILLINOIS

11EPALES
3

2111202
0008 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/09	14	20 0000	14.0		20	490	8.50	192	0.090	0.900	0.100	0.031
	14	20 0005	14.6	10.1		490	8.50	192	0.100	1.200	0.090	0.030
73/08/07	14	10 0000	25.3	7.2	6	573	8.70	274	0.170	2.800	0.180	0.108
73/10/16	14	55 0000	15.8		15	469						

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/09	14	20 0000	0.129	42.4
	14	20 0005	0.152	
73/08/07	14	10 0000	0.341	125.0
73/10/16	14	55 0000		50.6

STONET RETRIEVAL DATE 75/10/23

175502
42 24 15.0 088 10 05.0
FOX LAKE
17097 ILLINOIS

11EPALES
3

2111202
0010 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/09	14 45	0000	14.1		18	510	8.40	200	0.100	1.000	0.400	0.058
	14 45	0006	14.0	9.8		510	8.30	200	0.100	0.800	0.400	0.058
73/08/07	14 25	0000	24.8		12	577	8.70	203	0.220	2.700	0.180	0.129
	14 25	0005	24.9	6.2		577	8.60	203	0.210	3.400	0.150	0.135
	14 25	0013	24.8	6.2		578	8.60	203	0.230	3.000	0.160	0.127
73/10/16	15 10	0000	15.5	9.2	12	475						

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/09	14 45	0000	0.135	48.1
	14 45	0006	0.138	
73/08/07	14 25	0000	0.287	92.7
	14 25	0005	0.316	
	14 25	0013	0.306	
73/10/16	15 10	0000		24.3

47

STORET RETRIEVAL DATE 75/10/23

173301
42 23 18.0 088 12 22.0
PISTAKEE LAKE
17111 ILLINOIS

11EPALES
3

2111202
0010 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/09	15 00	0000	14.6		20	530	8.30	194	0.080	1.000	0.490	0.039
	15 00	0007	14.6	9.8		520	8.30	198	0.070	1.000	0.490	0.062
73/08/07	11 40	0000	24.7		10	586	8.70	288	0.120	2.900	0.200	0.105
	11 40	0004	24.6	8.0		584	8.70	292	0.140	2.400	0.200	0.125
73/10/16	15 20	0000	15.8	9.6	12	482	8.70	218	0.070	1.800	0.410	0.010

48A

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/09	15 00	0000	0.126	41.7
	15 00	0007	0.133	
73/08/07	11 40	0000	0.246	94.1
	11 40	0004	0.301	
73/10/16	15 20	0000	0.232	59.7

STORET RETRIEVAL DATE 75/10/23

173302
42 22 51.0 088 10 55.0
PISTAKEE LAKE
17097 ILLINOIS

11EPALES
3

2111202
0010 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/05/09	15 20	0000	14.6		24	500	8.50	192	0.110	1.000	0.260	0.035
	15 20	0007	14.5	9.6		500	8.50	192	0.120	1.200	0.270	0.036
73/08/07	11 55	0000	25.3	8.0	8	567	8.70	270	0.110	3.100	0.120	0.071
73/10/16	15 35	0000	15.6		12	451	8.90	198	0.060	1.600	0.060	0.073

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/05/09	15 20	0000	0.116	56.4
	15 20	0007	0.203	
73/08/07	11 55	0000	0.269	130.0
73/10/16	15 35	0000	0.201	73.3

APPENDIX E

TRIBUTARY and WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 75/10/23

1727A1
44 28 45.0 088 08 12.0
CHANNEL LK/LK MARIE CONNECTION
17135 7.5 FOX LAKE
I/LAKE MARIE
ST RT 173 BRDG 2 MI W OF ANTIOCH
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/02	14 05		0.010K	3.200	0.048	0.012	0.085
73/07/07	13 30		0.038	3.700	0.078	0.083	0.170
73/08/18	10 03			3.200	0.084	0.032	0.125
73/09/09	15 10		0.010K	2.000	0.046	0.016	0.085
73/10/14	11 00		0.060	1.580	0.210	0.046	0.132
73/11/04	12 25		0.084	1.550	0.105	0.028	0.145
73/12/02	11 35		0.148	2.800	0.192	0.036	0.105
74/01/06	13 40		0.252	1.700	0.200	0.020	0.065
74/02/10			0.630	2.500	0.500	0.180	0.330
74/03/18	12 15		0.504	2.600	0.185	0.025	0.075
74/03/24			0.490	2.600	0.140	0.015	0.155
74/04/03	12 30		0.300	1.500	0.025	0.010	0.050
74/04/30	07 15			1.300	0.035	0.015	0.100

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/10/23

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 172781
42 28 45.0 088 06 45.0
SEQUOIT CREEK
17       7.5 ANTIOCH
T/LAKE MARIE
ST RT 173 BRDG .5 MI W OF ANTIOCH
11EPALES                    2111204
4                           0000 FEET  DEPTH
```

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/02	14	15	0.350	3.000	0.260	0.231	0.375
73/07/07	13	15	0.770	3.400	0.610	0.620	0.785
73/09/09	14	55	1.500	8.200	1.300	2.200	2.700
73/10/28	12	00	0.780	6.600	2.900	1.700	1.880
73/11/04	12	10	0.950	4.500	1.840	1.260	1.700
73/12/02	11	30	0.720	2.900	1.160	0.840	0.950
74/01/06	13	37	0.490	2.000	0.630	0.400	0.525
74/03/18	12	04	0.390	2.900	0.360	0.145	0.260
74/03/24			0.336	8.000	0.780		0.230
74/04/03	12	45	0.232	1.850	0.410	0.195	0.290
74/04/30	07	15	0.290	1.700	0.375	0.280	0.440

STORET RETRIEVAL DATE 75/10/23

1727C1
42 26 50.0 088 08 08.0
BLUFF LAKE/LAKE MARIE CONNECTION
17 7.5 FOX LAKE
T/LAKE MARIE
BANK BETWEEN LAKES SW OF ANTIOCH AIRPORT
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/02	14	25	0.032	1.500	0.022	0.030	0.120
73/07/07	11	45	0.036	2.600	0.067	0.084	0.160
73/08/18	10	30		2.200	0.040	0.130	0.210
73/09/09			0.100	1.520	0.079	0.173	0.250
73/10/14	11	40	0.100	1.300	0.079	0.198	0.470
73/11/04	12	45	0.138	1.050	0.320	0.490	1.050
73/12/02	12	20	0.440	1.400	0.040	0.040	0.145
74/01/06	14	30	1.340	2.800	0.330	0.140	0.180
74/02/10			1.090	2.100	0.420	0.100	0.145
74/03/18	11	05	1.200	3.000	0.115	0.050	0.115
74/03/24			0.830	2.400	0.090	0.050	0.195
74/04/03	13	15	0.200	2.100	0.055	0.030	0.115
74/04/30	07	00	0.012	2.400	0.145	0.045	0.175

STORET RETRIEVAL DATE 75/10/23

172701 175681
42 27 51.0 088 08 46.0
LK MARIE/GRASS LK CONNECTION
17 7.5 FOX LAKE
0/LAKE MARIE
BANK 150 YDS NE OF CONNECTION
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/02	13 50		0.010K	4.600	0.078	0.102	0.325
	14 40		0.013	2.400	0.009	0.038	0.170
73/07/07	09 30		0.020	2.940	0.075	0.088	0.250
73/08/18	10 00			2.400	0.060	0.210	0.450
73/09/09	15 55		0.010K	2.500	0.046	0.180	0.375
73/10/14	10 20		0.005	1.900	0.036	0.270	0.650
73/11/04	12 30		0.015	1.450	0.024	0.048	0.175
73/12/02	12 00		1.340	1.300	0.064	0.096	0.230
74/01/06	13 59		0.570	2.700	0.320	0.100	0.165
74/02/10			1.060	2.300	0.270	0.085	0.195
74/03/18	12 18		1.200	2.900	0.120	0.050	0.135
74/03/24			0.810	1.900	0.021	0.037	0.170
74/04/03	12 00		0.430	2.100	0.025	0.015	0.125
74/04/30	06 40		0.012	1.500	0.040	0.035	0.158

K VALUE KNOWN TO BE
LESS THAN INDICATED

54
A

STORET RETRIEVAL DATE 75/10/23

17278A AS17278A P003300*
42 28 55.0 088 05 58.0
VILLAGE OF ANTIOCH
17135 7.5 ANTIOCH
T/LAKE MARIE
SEQUOIT CREEK
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/07/11	00 00								
CP(T)-			0.470	13.100	0.610	5.300	6.600	0.690	0.700
73/07/11	08 00								
73/08/22	00 00								
CP(T)-			0.920	12.600	1.660	8.200	8.800	0.510	0.525
73/08/22	08 00								
73/09/19	00 00								
CP(T)-			0.890	12.600	0.385		7.000	0.520	0.510
73/09/19	08 00								
73/10/17	00 00								
CP(T)-			1.360	10.000	0.087	4.200	5.600	0.529	0.509
73/10/17	08 00								
73/11/15	00 00								
CP(T)-			1.050	15.500	4.800	5.300	6.350	0.798	0.595
73/11/15	24 00								
74/02/13	00 00								
CP(T)-			0.240	11.000	1.080	3.120	5.300	0.750	0.750
74/02/13	08 00								
74/03/13	00 00								
CP(T)-			1.160	8.500		2.100	3.450	0.960	0.980
74/03/13	24 00								
74/04/09	00 00								
CP(T)-			0.440	10.000	0.270	2.800	3.450	0.884	0.900
74/04/09	24 00								
74/05/08	00 00								
CP(T)-			0.880	11.000		4.200	6.000	0.707	0.800
74/05/08	24 00								
74/06/12	00 00								
CP(T)-			1.750	1.800	0.159	2.059	2.500	0.890	0.800
74/06/12	24 00								
74/07/25	00 00								
CP(T)-			3.300	1.500	0.280	5.900	6.300	0.700	0.700
74/07/25	24 00								

55

STORET RETRIEVAL DATE 75/10/23

1756A1
42 28 45.0 088 10 40.0
FOX RIVER
17097 7.5 FOX LAKE
I/GRASS LAKE
ST RT 173 BRDG 4 MI W OF ANTIOCH
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/02	13 10		0.420	2.600	0.033	0.115	0.250
73/07/07	13 45		0.660	1.800	0.027	0.170	0.305
73/08/18	09 50			3.470	0.105	0.250	0.370
73/09/09			0.700	8.000	0.189	0.168	0.280
73/10/14	10 05		0.920	1.350	0.038	0.110	0.240
73/11/04	12 38		1.300	1.450	0.028	0.126	0.240
73/12/02	11 45		1.900	1.200	0.068	0.104	0.160
74/01/06	13 45		2.520	1.200	0.140	0.124	0.165
74/02/10			2.000	1.200	0.130	0.090	0.130
74/03/18	12 35		1.520	3.600	0.075	0.045	0.090
74/03/24			1.300	1.500	0.130	0.045	0.085
74/04/03	14 00		1.760	1.300	0.027	0.040	0.085
74/04/30	12 30		1.100	1.900	0.140	0.055	

STORET RETRIEVAL DATE 75/10/23

175681 172701
42 27 50.0 088 08 46.0
MARION/GRASS LK CONNECTION
17 7.5 FOX LAKE
T/GRASS LAKE
BANK 30 FT N OF CORNER OF WOOD SEAWALL
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/02	14	40	0.010K	2.400	0.018	0.039	0.170
73/07/07	11	30	0.029	2.600	0.046	0.081	0.185
73/08/18	10	40		2.200	0.050	0.176	0.315
73/09/09			0.028	7.500	0.130	0.126	0.275
73/10/14	11	20	0.250	1.600	0.071	0.150	0.260
73/11/04	13	00	0.240	1.750	0.019	0.031	0.175
73/12/02	12	45	0.600	1.400	0.020	0.040	0.145
74/01/06	14	00	2.940	2.400	0.312	0.116	0.230
74/02/10			1.120	1.700	0.165	0.090	0.195
74/03/18	13	12	1.200	3.700	0.155	0.065	0.120
74/03/24			0.840	1.600	0.040	0.035	0.130
74/04/03	12	15	0.420	3.400	0.580	0.135	0.280
74/04/30	06	40		1.600		0.030	0.185

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/10/23

1756C1 1755A1
42 25 32.0 088 09 50.0
GRASS/FOX LAKE CONNECTION
17 7.5 FOX LAKE
0/GRASS LAKE
BRDG ON GRASS LK RD E OF LOTUS WOODS
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/02	15 52		0.010<	1.980		0.042	0.175
73/07/07	10 40		0.010<	2.600	0.027	0.083	0.300
73/08/18	12 30			2.520	0.082	0.190	0.315
73/09/04			0.072	6.500	0.147	0.115	0.300
73/10/14	12 30		0.820	1.530	0.050	0.105	0.230
73/11/04	13 00		0.010<	2.450	0.024	0.025	0.210
73/12/02	13 00		1.700	1.100	0.020	0.082	0.188
74/01/06	14 40		2.700	3.300	0.224	0.100	0.230
74/02/10			2.000	1.400	0.190	0.095	0.135
74/03/18	13 30		0.520	4.000	0.230	0.025	0.075
74/03/24			0.300	1.500	0.050	0.015	0.040
74/04/03	14 15		0.264	1.800	0.020	0.010	0.093
74/04/30	07 05			1.400	0.020	0.020	0.125

< VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/10/23

175SA1 1756C1
42 25 32.0 088 09 50.0
GRASS/FOX LK CONNECTION
17099 7.5 FOX LAKE
1/FOX LAKE
BRDG ON GRASS LK RD E OF LOTUS WOODS
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/02	11 05		0.044	4.900	0.090	0.046	0.172
73/07/07	11 15		0.017	4.200	0.066	0.088	0.290
73/08/25	10 55		0.046	3.200	0.052	0.160	0.310
73/09/22	11 03		0.250	1.890	0.037	0.088	0.270
73/10/13	09 50		0.947	2.000	0.091	0.044	0.200
73/11/03	11 30		1.043	1.850	0.038		0.360
73/12/01	10 15		2.000	0.900	0.048	0.040	0.145
74/01/05	11 30		3.000	0.900	0.132	0.122	0.155
74/02/02	10 40		3.525	1.200	0.100	0.115	0.128
74/02/16	11 00		1.920	1.100	0.140	0.090	0.130
74/03/02	10 15		2.100	2.000	0.095	0.070	0.120
74/03/16	10 55		1.700	1.400	0.020	0.050	0.130
74/04/06	10 15		1.300	1.100	0.015	0.035	0.110
74/05/04	10 55		0.560	2.000	0.030	0.030	0.230

STORET RETRIEVAL DATE 75/10/23

175581
42 25 40.0 088 08 08.0
PETTITE/FOX LAKE CONNECTION
17 7.5 FOX LAKE
T/FOX LAKE
BANK BETWEEN LKS .5 MI NE OF KLONDIKE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/02	10	55	0.012	5.100	0.092	0.126	0.310
73/07/07	10	40	0.023	4.000	0.078	0.076	0.185
73/08/25	10	35	0.017	3.000	0.031	0.150	0.560
73/09/22	10	42	0.010K	1.380	0.024	0.120	0.230
73/10/13	09	30	0.044	2.100	0.060	0.100	0.180
73/11/03	11	00	0.150	1.700	0.079		0.315
73/12/01	09	50	0.264	1.300	0.032		0.270
74/01/06	11	30	1.900	1.200	0.200	0.120	0.153
74/02/02	10	20	1.930	1.000	0.220	0.130	0.160
74/02/16	10	50	1.340	1.200	0.190	0.085	0.135
74/03/02	10	00	1.600	1.300	0.165	0.090	0.135
74/03/16	10	34	1.320	1.300	0.130	0.075	0.130
74/04/06	10	00	0.136	1.700	0.025	0.010	0.090
74/05/04	10	15	0.020	0.900	0.015	0.020	0.160

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/10/23

17550I
42 23 40.0 088 09 15.0
SQUAW CREEK
17 7.5 FOX LAKE
T/FOX LAKE
BRDG ON ST RT 596132 E OF FOX LAKE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/02	10 20		0.810	3.000	0.110	0.150	0.230
73/07/07	10 05		0.033	4.000	0.080	0.210	0.390
73/08/25	17 57		0.024	3.000	0.066	0.443	0.562
73/09/22	10 16		0.075	1.500	0.138	0.440	0.550
73/10/13	09 20		0.570	2.000	0.200	0.430	0.560
73/11/03	10 15		0.540	2.400	0.370		0.690
73/12/01	09 30		0.800	1.900	0.340	0.460	0.720
74/01/06	11 10		1.680	1.900	0.410	0.300	0.370
74/02/02	09 59		2.100	1.100	0.250	0.155	0.220
74/02/16	10 35		2.100	1.400	0.270	0.155	0.230
74/03/02	09 45		1.920	1.600	0.300	0.170	0.290
74/03/16	10 10		1.260	1.800	0.368	0.200	0.328
74/04/06	09 30		1.120	1.800	0.390	0.230	0.330
74/05/04	18 00		0.830	0.100K	0.045	0.175	0.290

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/10/23

175501 173381
42 24 07.0 088 11 05.0
NIPPERSINK/PISTAKEE LK CONNECTIO
17 7.5 FOX LAKE
O/FOX LAKE
US 12 BRDG AT NW EDGE OF FOX LAKE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/02	10 10		0.054	3.150	0.048		0.033
73/06/03	13 30			3.700			
73/07/07	09 30		0.027	3.570	0.140	0.110	0.240
	09 50		0.022	1.900	0.120	0.100	0.210
73/08/25	17 25		0.010R	1.890	0.037	0.152	0.220
73/09/08	12 55		0.010R	1.930	0.035	0.140	0.270
73/09/22	09 47		0.210	1.760	0.036	0.094	0.250
73/10/13	09 00		0.290	2.150	0.073	0.115	0.210
	10 30		0.280	1.800	0.046	0.110	0.210
73/11/03	09 30		0.105	1.700	0.030		0.290
	11 00		0.680	1.700	0.034		0.295
73/12/01	09 20		0.616	1.200	0.024	0.068	0.320
74/01/06	10 00		1.500	1.700	0.276	0.160	0.220
	12 35		1.520	2.300	0.270	0.168	0.220
74/02/02	09 35		2.270	1.300	0.260	0.140	0.185
74/02/16	10 20		1.920	1.700	0.280	0.120	0.175
74/03/02	09 30		1.700	1.900	0.260	0.125	0.200
74/03/03	09 46		2.400	1.400	0.225	0.125	0.195
74/03/09	10 55		1.500	1.100	0.100	0.070	0.165
74/03/16	09 52		1.510	1.250	0.055	0.065	0.143
	09 55		1.600	2.800	0.130	0.065	0.122
74/04/06	09 20		0.740	1.700	0.030	0.025	0.165
74/05/04	09 00		0.312	1.500	0.020	0.030	0.165
	17 40		0.072	2.100	0.020	0.035	0.225

R VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/10/23

1733A1
42 24 50.0 088 12 00.0
NIPPERSINK CREEK
17097 7.5 FOX LAKE
T/PISTAKEE LAKE
US 12 BRDG JUST W MCHENRY/LAKE CO BORDER
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	13 40		1.600	1.470	0.026	0.039	0.175
73/07/07	10 05		1.500	2.310	0.060	0.110	0.195
73/08/04	10 35		2.000	3.150	0.088	0.140	0.210
73/09/08	13 05		1.660	1.020	0.080	0.126	0.195
73/10/13	10 40		1.520	1.800	0.070	0.132	0.280
73/11/03	11 10		1.360	1.150	0.072	0.092	0.165
73/12/02	12 30		1.760	0.900	0.032	0.052	0.150
74/01/05	12 20		3.000	0.700	0.108	0.072	0.100
74/02/03	15 30		3.300	1.000	0.115	0.110	0.165
74/03/09	11 05		2.550	1.500	0.070	0.065	0.195
74/03/16	10 05		2.600	3.400	0.130	0.050	0.125
74/04/07	12 45		2.080	1.900	0.260	0.075	0.155
74/05/18	09 30		1.800	1.800	0.070	0.090	0.400

STORET RETRIEVAL DATE 75/10/23

173381 175501
42 24 07.0 088 11 05.0
NIPPERSINK/PISTAKEE LK CONNECTIO
17 7.5 FOX LAKE
T/PISTAKEE LAKE
US 12 BRDG AT NW EDGE OF FOX LAKE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/02	10 10		0.054	3.150	0.048	0.033	0.150
73/06/03	13 30		0.017	3.700	0.026	0.032	0.200
73/07/07	09 50		0.023	2.310	0.131	0.105	0.220
73/08/04	10 30		0.015	5.100	0.042	0.110	0.260
73/09/08	12 55		0.016	2.520	0.041	0.132	0.270
73/10/13	10 30		0.270	1.900	0.054	0.110	0.220
73/11/03	11 00		0.071	1.300	0.023	0.037	0.185
73/12/02	10 45		0.960	1.600	0.020	0.056	0.170
74/01/05	12 55		1.520	1.400	0.270	0.168	0.210
74/02/03	09 45		2.000	1.100	0.210	0.130	0.180
74/03/04	10 55		1.600	1.200	0.095	0.070	0.170
74/03/16	09 55		0.750	0.900	0.045	0.035	0.195
74/04/07	12 10		0.940	2.100	0.360	0.110	0.310
74/05/18	08 50		0.320	1.300	0.025	0.035	0.140

STORET RETRIEVAL DATE 75/10/23

1733C1
42 22 35.0 088 10 40.0
REDHEAD/PISTAKEE LK CONNECTION
17 7.5 FOX LAKE
T/PISTAKEE LAKE
BANK .5 MI W OF MERGENCE OF RTS 59 US 12
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	14	30	0.010K	3.100	0.060	0.022	0.075
73/07/07	10	40	0.029	2.900	0.082	0.027	0.120
73/08/04	11	20	0.022	3.300	0.029	0.027	0.130
73/09/08	13	40	0.013	1.600	0.025	0.040	0.195
73/11/03	11	40	0.039	1.350	0.072	0.021	0.180
73/12/02	12	00	0.108	3.700	0.048	0.012	0.160
74/01/05	10	45	0.136	1.600	0.280	0.020	0.040
74/02/02	13	30	0.910	0.900	0.200	0.030	0.055
74/03/04	12	15	0.830	1.300	0.020	0.015	0.100
74/03/16	10	40	0.252	2.300	0.110	0.015	0.080
74/04/07	13	30	0.160	1.200	0.290	0.035	0.080
74/05/18	08	40	0.368	1.800	0.185	0.022	0.105

K VALUE KNOWN TO BE
LESS THAN INDICATED

STONET RETRIEVAL DATE 75/10/23

173301
42 21 50.0 088 13 07.0
LAC LOUETTE/PISTAKEE LK CONNECTI
17 7.5 WAUCONDA
T/PISTAKEE LAKE
HWY BRDG 1 MI W MCHENRY/LAKE CO BORDER
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	14	15	0.016	3.780	0.066	0.016	0.085
73/07/07	10	30	0.018	2.200	0.050	0.027	0.075
73/08/04	11	05	0.015	2.310			
73/09/08	13	25	0.020	2.100	0.044	0.110	0.200
73/10/13	11	05	0.168	1.900	0.130	0.022	0.065
73/11/03	11	25	0.092	1.500	0.055	0.017	0.220
73/12/02	11	15	1.340	3.000	0.080	0.052	0.155
74/01/05	11	10	0.760	1.100	0.148	0.024	0.060
74/02/02	14	20	0.880	0.900	0.080	0.020	0.105
74/03/09	12	05	0.756	1.400	0.010	0.010	0.090
74/03/16	10	20	0.252	1.900	0.072	0.010	0.050
74/04/07	13	15	0.570	2.000	0.480	0.075	0.165
74/05/18	10	30	0.032	1.400	0.040	0.017	0.100

STORET RETRIEVAL DATE 75/10/23

1733E1
42 22 37.0 088 14 15.0
FOX RIVER
17 7.5 FOX LAKE
O/PISTAKEE LAKE
HWY BRDG JUST SE OF JOHNSBURG
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/03	14 00			2.310		0.024	0.175
73/07/07	10 20		0.138	3.700	0.105	0.078	0.200
73/08/04	10 55		0.018	3.150	0.044	0.110	0.280
73/09/08	13 20		0.016	2.300	0.037	0.150	0.300
73/10/13	10 55		0.420	3.050	0.044	0.126	0.315
73/11/03	11 20		0.014	1.450	0.046		0.240
73/12/02	11 45		0.312	1.400	0.084	0.012	0.040
74/01/05	11 30		2.000	1.100	0.224	0.132	0.175
74/02/02	14 50		2.300	1.000	0.200	0.120	0.160
74/03/09	11 15		1.680	1.300	0.095	0.070	0.180
74/03/16	10 45		1.440	4.000	0.170	0.050	0.135
74/04/07	12 25		1.120	1.900	0.360	0.090	0.240
74/05/18	11 00		0.360	1.400	0.025	0.019	0.135

STORET RETRIEVAL DATE 75/10/23

1733F1
42 20 45.0 088 15 25.0
FOX RIVER
17 15 MCHENRY
T/PISTAKEE LAKE
AT MCHENRY STATE PARK
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/10/13	12 25		0.410	4.300	0.170	0.088	0.200
73/11/03	12 35			1.200	0.147	0.023	0.230
73/12/03	16 00		1.090	1.100	0.020	0.056	0.160
74/01/05	09 30		2.300	1.000	0.184	0.124	0.158
74/02/02	10 05		2.200	0.900	0.200	0.120	0.160
74/03/09	13 05		1.760	1.400	0.100	0.070	0.210
74/03/16	11 25		1.520	1.425	0.045	0.055	0.145
74/04/07	14 20		1.090	1.700	0.330	0.080	0.190
74/05/18	12 00		0.368	1.800	0.035	0.025	0.145

STORET RETRIEVAL DATE 75/10/23

1733AA TF1733AA P000800
42 28 57.0 088 27 55.0
HEBRON MUNICIPAL
17097 1.5 HEBRON
T/PISTAKEE LAKE
NIPPERSINK CREEK
11EPALES
4 2141204
0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/07/17	11 00		5.600	18.900	5.400	5.100	16.500	0.050	
73/08/20	08 30		8.600	8.400	0.200	5.700		0.061	0.045
73/09/06	08 45		7.600	9.700			13.000	0.058	0.052
73/12/12	13 15		10.400	17.500	3.000	6.000	14.300	0.043	0.048
74/01/17	13 00		11.800	19.000	4.600	10.600	12.800	0.046	0.048
74/05/07	10 30		7.400	6.800		3.700	4.600	0.050	0.047
74/06/17	10 30		17.600	10.000	0.180	6.500	9.800	0.043	0.062

STORET RETRIEVAL DATE 75/10/23

1733AB PD1733AB P000000*
42 28 57.0 088 27 55.0
HEBRON INDUSTRIAL
17 7.5 HEBRON
T/PISTAKEE LAKE
NIPPERSINK CREEK
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/07/17	11 30		2.100	8.500	0.190	0.810	1.400		
73/08/20	09 00		1.700	19.800	0.052	0.480		0.102	0.150
73/09/06	09 30			24.000		0.430	1.700	0.106	0.127
73/12/12	13 45		5.900	21.000	7.000	2.000	2.400	0.100	0.105
74/01/17	14 00		2.640	47.000	30.500	3.200	3.700	0.228	0.225
74/05/07	10 00		5.880	3.500	0.120	0.150	0.180	0.057	0.050
74/06/17	10 00		5.880	7.000	0.180	0.440	0.780	0.060	0.120